Department of Energy
Office of Science
Washington, DC 20585

January 30, 2006

Office of the Director
ES2006001060

MEMORANDUM FOR THE DEPUTY SECRETARY

THROUGH: INGRID KOLB
DIRECTOR
OFFICE OF MANAGEMENT

FROM: RAYMOND L. ORBACH
DIRECTOR
OFFICE OF SCIENCE

SUBJECT: Site Utilization Management Plan for the Argonne National Laboratory

ACTION: We request that the Deputy Secretary approve the Site Utilization Management Plan (SUMP) for the operation of the Argonne National Laboratory

ISSUE: The Office of Science is providing the Site Utilization Management Plan for the Argonne National Laboratory. The Office of Science is competing the operation of this facility as required by section 301 of the Energy and Water Appropriations Bill.

DISCUSSION: The attached Site Utilization Plan has been prepared by the Argonne Site office, Office of Science and addresses the evolving core mission of the Argonne National Laboratory over the next five years.

Acquisition Letter 2000-08 does not require a specific format for the SUMP. An abbreviated format has been adopted for brevity and efficiency in communicating the Argonne Mission. A more detailed understanding of the key programs and activities can be found in the Argonne lab Institutional Plan FY 2004-2008, and the Argonne National Laboratory facility Ten Year Site Plan which covers FY 2007- FY 2016 either of which we will provide upon request.

This SUMP has been fully coordinated with the Office of Contract Management and has been briefed to the Director of the Office of Management.

SENSITIVITIES: None

POLICY IMPACT: None

RECOMMENDATION: Approve the attached Argonne National Laboratory Facility SUMP. Upon approval, we will complete development of the Request for Proposals (RFP) for the competition for operation of this important scientific facility.

Approved: Clay Sell

Disapproved: _____

Date: February 7, 2006

Attachment

ARGONNE NATIONAL LABORATORY (ANL)

Site Utilization and Management Plan (SUMP)

October 25, 2005

1. BACKGROUND/STRATEGIC POSITIONING

The Department of Energy (DOE) is the third largest government sponsor in the United States for science and technology, and the Office of Science within DOE establishes the focus and goals for basic science and technology. Argonne National Laboratory (ANL) plays a key role in ensuring "that the U.S. maintains scientific primacy in the key research disciplines that we support, that our science programs are relevant and useful for identified national priorities, and that we are agile enough to respond to emerging scientific challenges." (DOE Office of Science Strategic Plan, 2004)

ANL is a premier DOE multidisciplinary laboratory that provides extensive capabilities in both world-class research expertise and unique facilities that do not exist elsewhere and are generally beyond the capability of any nongovernmental institution to construct and/or operate. Through these national resources, which are available to researchers from industry, universities, other government agencies, and other nations, the Department advances the energy, environmental, economic and national security well-being of the United States, provides for the international advancement of science, and educates future scientists and engineers.

ANL ensures U.S. scientific and technological leadership by creating, in the national interest, new knowledge and technologies that enhance energy security, national security, economic productivity, and quality of life. The Laboratory is a full participant in the implementation of administration priorities set forth by the President's science advisor. ANL is committed to managing its resources to maximize benefit to the tax payer, with DOE's critical performance measures as its guide.

2. IDENTIFICATION OF DOE PROGRAM OFFICES

ANL's scientific and technical experts support a broadly diversified research effort in support of DOE major R&D focus areas. This includes programs in Basic Energy Sciences, Nuclear Energy, Nanotechnology, High Energy Physics, Computational Science, Nuclear Physics, Chemistry, Materials Science, Environmental Science, Biology, and National Security. Collaboration among the various ANL Divisions, as well as other national and international institutions, is also a major strength and focus of its mission.

Description of Existing Business Lines

ANL brings a set of substantial strengths to the DOE/SC laboratory complex. ANL is considered "best in class" nationally and internationally in materials science, mathematics and computer as well as computational science, nuclear reactor physics and engineering, nuclear fuel separations, structural biology, decision and information sciences, and environmental assessment.

The following ANL highlights are examples of Argonne's world leadership:

- Design, construction, and operation of the nation's most powerful and productive x-ray facility (APS)

  - Characterization of molecules, soft and hard materials, and biological complexes
  - On-site capabilities in neutron scattering (IPNS) and electron microscopy
- Broadly based, applications-oriented accelerator research
  - Light sources to heavy-ion accelerators
  - Fundamental work on superconducting (low-beta) RF cavities & dielectric Wakefield accelerators
- Materials Science
  - Vortex dynamics in superconductors
  - Design and synthesis of complex oxides for applications in magnetism, ferroelectricity, etc.
- Basic and applied computer science,
  - Integration of software expertise and advanced hardware architecture
  - Tools for parallel and distributed computing used in all major computing systems
- Structural biology
  - Nation's most prolific source of bio-molecular structure information
- Low-energy nuclear physics, the third triad of modern nuclear physics
  - ATLAS is the Nation's premier facility
- Nuclear engineering design for new generation of nuclear reactors and closed fuel cycle
- Infrastructure vulnerability analyses
  - Analysis tools developed at ANL
  - Key post-9/11 national resource in the battle against international terrorism.

The following "Clusters of Excellence" are representative of Argonne's business lines:

2.1 Materials Cluster:

At ANL, materials research is strong and growing, and internationally prominent; being engaged across the Laboratory spanning basic research in the Materials Science and Chemistry Divisions, the Center for Nanoscale Materials, and significant parts of the Biology Division (structural biology, self-assembly, biochemistry), as well as the scientific core programs at the Advanced Photon Source, Electron Microscopy, and Intense Pulsed Neutron Source. Applied materials research and development spans Argonne's Energy Technology and Energy Sciences Divisions as well as ANL's Chemical Engineering and Nuclear Engineering Divisions.

The core capabilities relate to ANL's ability to muster a broad range of tools for materials characterization including innovative bench science tools such as scanning probe microscopy and nanocalorimetry as well as world leading user facility-based tools such as the Advanced Photon Source, Center for Nanoscale Materials, Intense Pulsed Neutron Source, and Electron Microscopy Center.

These user facilities are the most prominent public benefit of Argonne's materials research based on a core competence in accelerator research, technology and facilities operation. While capable of being operated as stand-alone entities, the close scientific coupling to Argonne's research divisions has historically assured the continued excellence of Argonne's user facilities.

Lead basic research customers have historically been aligned with these divisions representing the DOE Office of Science, predominantly BES and BER, while applied materials research customers within DOE are predominantly within EERE and NE, with a significant work-for-others component, with examples such as the artificial retina and new materials for semiconductor memories.

2.2 Computing and Computational Sciences Cluster:

Argonne provides world leadership in computing and computational science. This cluster includes the Mathematics and Computer Science and the Decision and Information Sciences Divisions, as well as the numerous applications-oriented computing activities in the Biology, Chemistry, and Materials Science Divisions, the Center for Nanoscale Materials, the nuclear and high energy physics programs, and the Engineering Research, the Energy and Environmental Science and Technology, and National Security efforts. Our broad strategy is to leverage our excellence in core computer science research to build new capabilities in areas of emerging opportunity in computational science. For the next several years, ANL's contribution to national leadership computing capability will build around IBM Blue Gene/Light (BG/L) and its successors, which will approach sustained petaflops/sec performance levels by 2008. ANL will also collaborate on development and deployment of other computing platforms such as the Cray X series, IBM Power series, and next-generation commodity clusters, located at collaborating DOE/SC laboratories.

The public's primary benefit is that ANL has long played the lead role in making high performance computers user friendly, efficient and effective with enhanced operations and equally important, by developing and applying tools for analysis and visualization of large, complex data sets, for enabling and enhancing scientific communications and the building of distributed scientific teams.

The lead DOE customer is the Office of Science Advanced Scientific Computing Research program, with significant work-for-others efforts on behalf of the NSF, NIH, and major computer hardware and software vendors.

2.3 Advanced Bioscience/technology Cluster:

Argonne's growing bioscience and technology effort is built on Argonne's world-leading strengths in imaging (e.g., the Advanced Photon Source, the Intense Pulsed Neutron Source, electron microscopy) and key technological platforms (e.g., structural genome analysis, high-throughput protein production and crystallization, protein mapping, combinatorial biology, nanotechnology, biocatalysis, bioinformatics, and biochips) and developing cryomicroscopy and scanning force microscopy capabilities to determine the three-dimensional structures of macromolecular assemblies at atomic resolution. Not by accident, Argonne's Midwest Structural Biology Center is the world leader in determining protein structures.

This imaging strength uniquely positions Argonne extremely well to truly unlock the potential of genomics by understanding the composition and function of the biochemical networks and pathways that carry out the essential processes of living organisms – it provides linkages between the many molecular players in a cellular process, and produces detailed information about the coordination of their activities and ultimately forms the basis of the long sought development of an integrated and predictive model of cellular function.

These developments will take place as part of larger programmatic efforts in biodefense, environmental research, nanotechnology, and material sciences; and coordinated efforts in these areas with the University of Chicago, including joint recruitment and collaborations such as the new Ricketts Center. Cellular processes are ultimately responsible for basic functions ranging from energy conversion via photosynthesis to molecular recognition and defense against invading bacteria. Such research can result in applications as diverse as novel therapeutics, biological and chemical warfare detection and defense capabilities, alternative energy sources, and unique biologically inspired materials. In every case, however, by emphasizing the interdisciplinary aspects of this research, we will capitalize on current programs, from the Midwest Structural Biology Center and Great Lakes Regional Center of Excellence to the Center for Nanoscale Materials and DOE-sponsored programs in bio-inorganic interfaces.

The lead customer for the advanced bioscience/technology cluster is the NIH, while the DOE Office of Science BER is a growing customer; we see the Office of Science BES as a potential strong customer as we grow our nano-biology capabilities from this base.

2.4 Fundamental Physics Cluster:

This Cluster reflects strong world-leading laboratory programs that are well aligned with and, indeed, help define the goals and plans of the DOE Nuclear Physics and High Energy Physics programs while building on the growing connections between high-energy and nuclear physics and astrophysics and cosmology – that is, the recognition that the fundamental properties of energy and matter, and of time and space, can and must be explored on both the largest and smallest scales possible.

Argonne is committed to continuing to be a center of excellence for nuclear physics research in the foreseeable future. This commitment encompasses our predominant stable beam user facility, the Argonne Tandem-Linac Accelerator System (ATLAS), and an integrated research program in nuclear theory and medium-energy nuclear physics at the forefront of nuclear structure physics and nuclear astrophysics.

In High Energy Physics, our productive programs at hadron colliders – both at Fermilab and at the Large Hadron Collider (LHC) – and in neutrino physics are at the center of the DOE high energy physics agenda. Our experience with building hadronic calorimeters, triggers, and offline software provides understanding and insight for the physics analysis that we will begin when data are available. The demonstrated technical capabilities of ANL's high-energy physics program will play a key role in our future; the calorimeter delivered by our group to CERN, and currently being installed there, is a good illustration. This group is widely respected for its ability to construct and deliver – on time and within budget – the highly complex, state-of-the-art technology that is characteristic of modern experimental high energy physics. The continuation of our work in neutrino physics, using the FNAL NuMI beam as well as reactor neutrinos, will similarly build on a unique combination of technical strength and physics insight.

The lead customers for this cluster are the DOE Office of Science High Energy and Nuclear Physics Programs.

2.5 Energy and Environmental Science and Technology Cluster:

The present fossil fuel-based energy economy is increasingly confronted by the combined challenges of constrained supply and growing environmental concerns. ANL uniquely combines strong efforts in both nuclear and non-nuclear energy and industrial science to meet these challenges.

ANL, while fully cooperating with INL, remains the leading DOE, if not worldwide, laboratory in the areas of fundamental nuclear reactor and fuel cycle science and engineering; and our basic and applied materials research will be a key element in component-level design of both fission and fusion reactors. We are strengthening our systems development and analysis capabilities by focusing on our expertise in lab-scale chemical process development, our leading-edge reactor and fuel cycle design capabilities, and a significantly enhanced capability in simulation of nuclear energy system processes (which relate to the expected growing role for the Nuclear Regulatory Commission in independent assessment of the safety of new nuclear plant designs). ANL, through its leading program in the fundamental properties of actinide materials, will continue to make important contributions to managing current nuclear waste problems and preventing future ones.

A major focus of our energy and environmental effort on the non-nuclear side is to "remove transportation from the environmental equation" while aiding in development of affordable, efficient, and usable vehicles -- from cars to heavy trucks to locomotives as exemplified by our best-in-class Transportation Research Facility which is closely coupled with industrial collaborators and complemented by university-based research and teaching programs.

ANL's research and development program in transportation encompasses efforts on the fuel consumption of vehicles "from wells to wheels"; the development of new lubricants and coatings that will increase the lifetime and efficiency of internal combustion engines; computer technologies for simulating vehicle crash-testing; the analyses of the combustion process from injection of fuel to emission of exhaust; the development of high-power batteries with long life and low cost, which are critical for enabling hybrid vehicles to achieve a greater national impact; and the development of fuel cells that will have multi-fuel capability and power densities/start-up times/power sufficient for consumer vehicles.

The ANL research on internal combustion engines and processes may lead to a new generation of clean-burning, affordable, fuel-efficient vehicles, permitting the nation to stretch the lifetime of petroleum resources and decrease its dependence on foreign sources of oil while improving the air quality in major urban areas.

The hydrogen initiative of DOE and the automobile industry is designed to provide the best possible case for renewable, clean transportation. Argonne is active in developing catalytic systems that will allow the use of natural gas and petroleum-based liquid fuels in fuel cell power production. These systems permit the effective development of a hydrogen infrastructure while using existing hydrocarbon resources with maximal efficiency and minimal environmental effect. ANL has been a leader in developing hydrogen-based fuel cell systems that may be the next generation of vehicle power systems: emission-free and capable of powering movement, vehicle air conditioning,

and amenities, they may serve not only as transportation but as primary and backup power sources for homes and commercial buildings.

Argonne has overall operations management responsibility for the Atmospheric Radiation Measurement Climate Research Facility (ACRF), a national user facility for researchers seeking to improve the simulation capabilities of global climate models through a better understanding of cloud and radiation physics. The ACRF provides data from surface-based remote sensors at three fixed sites (two in North America and one in the Western Pacific) and one mobile site. Argonne is also incorporating atmospheric aerosols into global climate models; combining detailed knowledge of the physical and optical properties of these small particles with an understanding of the chemical processes by which they form into large particles will significantly reduce the uncertainty associated with predictions of climate change.

Argonne's primary customers are the DOE Offices of Nuclear Energy and Energy Efficiency and Renewable Energy.

2.6 National Security Cluster:

The Laboratory has a broad program related to a variety of national security issues, ranging from the RERTR program nuclear forensics to bioagent detection, as well as infrastructure threat, vulnerability and response assessment and response analysis. Argonne was intimately involved in providing security support for the most recent Republican and Democratic National Conventions.

Lead customers are the NNSA non-proliferation office, the DHS, and the Intelligence Community.

Laboratory Core Competencies

Argonne's current business lines and future initiatives draw on and reinforce key core competencies:

Accelerator and Detector Research, Technology and Operations

Argonne uniquely applies basic materials science of superconducting RF cavities and construction of high-brightness electron guns together with engineering and project management capabilities to build and operate entire accelerator complexes and user facilities. Examples of recent and ongoing leading activities include:

- APS accelerator and beam lines - design, construction and operation
- IPNS accelerator and detectors – design, construction and operation
- RIA design and prototyping, esp. of low-beta, large volume, cavities
- Development and construction of innovative instruments for the SNS
- Major contributions to SLAC's LCLS
- Help in tuning of the Tevatron/Booster
- Design and construction of the CNM x-ray nanoprobe
- Advanced designs for electron microscopy, including the TEAM project
- Major contributions to general accelerator science: EPICS ...

Inorganic and Biological Materials Characterization and Synthesis

ANL offers a broad range of nationally available user facilities for characterizing inorganic and biological materials, together with an integrated approach for allowing access to these facilities; this approach has been enabled both by the founding of an

integrated facilities unit and by close collaboration between this facilities unit and the basic sciences at ANL. Examples of leading activities include:

- Facilities:
  - X-rays (Advanced Photon Source [APS], Center for Nanoscale Materials [CNM])
  - Neutrons (Intense Pulsed Neutron Source [IPNS])
  - Electrons (Electron Microscopy Center [EMC])
- Characterization, Synthesis, Fundamental Understanding:
  - Expertise in synthesizing and understanding oxide materials, coupled to APS, IPNS, EMC:
    - *Major advances in superconductivity, ferroelectrics and magnetic materials*
  - Optimized crystal growth of proteins and other biomolecules, & automation of x-ray scattering beam lines
    - *ANL is the leading structural biology facility in the nation*

Nuclear Fuel Cycle and Reactor Design

ANL's strengths lie in tackling the broad range of problems associated with the nuclear fuel cycle, at levels ranging from the basic science of, viz., fuel rod design and separation chemistry to the complex of problems related to reactor design and the closed fuel cycle. Examples of recent and ongoing international leadership:

- Actinide/separation chemistry
- Design and simulation of
  - Fast spectrum reactors, from gas-cooled to liquid metal
  - Modular reactors design leadership with France and Japan
  - Closed fuel cycle, including reprocessing technologies
  - Supporting experimentation, from basic materials science studies of nuclear reactor components to systems-level analyses of performance, safety, and electricity production costs

Transportation Science and Engineering

ANL's strengths lie in combining fundamental science and engineering work in key areas such as catalysis and combustion with applied research directly relevant to, and connected to, the transportation industry. Examples of recent and ongoing leading activities:

- Catalytic production of H from hydrocarbon feedstock ("reformers")
- Fundamental studies of flames and sprays using the APS ("x-ray transparent engine")
- Performance improvements for fuel cell technology
- Diesel engine technology improvements and benchmarking for the railway industry
- Performance benchmarking of hybrid car engine technology for industry
- Smart Signal Technology software.

Computational Sciences

ANL's world-leading computing expertise and software systems power all major computational platforms. ANL's strength is in tying together computer science,

advanced architecture research, and applied modeling and simulation to carry out leading-edge research and build high-impact solutions. This is achieved through extensive collaborations with industry, other national laboratories, and universities.

The following are example research areas and systems:

• Simulation Systems	Numerical Reactor, SEED
• Programming tools and environments	MPICH, Jumpshot
• Middleware for distributed computing	Globus, Access Grid
• Scalable algorithms and numerical software	PETSc library, TAO
• Computational mathematics	MINPACK, NEOS
• Visualization and data management tools	ROMIO, CAVE
• Systems software	Extreme Linux

Integration of Computing, Science, Engineering, and Economic Expertise

ANL offers broad-based, internationally recognized expertise in the key technologies underlying energy and environmental issues, combined with a history of collaboration. Areas of expertise include

- Energy, environment, and economic systems analysis (especially modeling and simulation)
- Energy supply technologies (especially nuclear power, fossil energy, electricity)
- Utilization technologies (especially transportation, industry)
- Infrastructure (especially reliability and security considerations)
- Environmental impacts (especially integrated environmental impact assessments)
- Macroeconomic energy and environment analyses

ANL develops pathways for generating basic scientific breakthroughs that lead to practical, high-impact products. Examples of recent and ongoing leading activities:

- Development and exploitation of agent-based modeling software tools to attack broad classes of problems related to DOE's mission, such as
  - ANL's PROTECT system, deployed at the 2004 Democratic and Republican Conventions
  - EIS for Trans-Alaska pipeline system from Prudhoe Bay to the Port of Valdez
- Analyses of the economics of energy technologies and strategies
  - Exemplified by the now-well-known "Chicago study" of the economics of nuclear (fission) energy, entitled The Economic Future of Nuclear Power.

Fundamental Nuclear Physics, Tied to Cosmology and the Origins of the Elements

ANL's fundamental nuclear physics program is based on an internationally leading in-house low-energy nuclear physics program centered on the Argonne Tandem Linear Accelerator System (ATLAS) with strong ties to experimental nuclear physics programs at JLab and RHIC and to nationally ranked particle astrophysics and nuclear astrophysics programs. The basic physics strengths of the Laboratory (especially in experimental physics and computational science and theory) are coupled to

- The world's leading cosmology program at the U. of Chicago
- The only NSF Physics Frontier Center in nuclear astrophysics
- The DOE/NNSA-funded ASC/Alliance Center for Astrophysical Thermonuclear Flashes at the U. of Chicago.

Examples of recent and ongoing leading activities:

- ATLAS/RIA:
  - Fundamental structure of heavy nuclei
  - Origin of matter synthesized in core collapse and thermonuclear supernovae
  - Constraining the age and size of the universe
- FLASH: Building simulation software using world's most powerful computers to study
  - Basic physics of explosive nucleosynthesis
  - Physics of novae and Type Ia supernovae
  - Basic physics understanding for of the fundamental "measuring sticks" for the size and age of the universe and for measuring the amount of dark energy in the universe

Large-Project Delivery

For over 50 years, from the first high-energy physics facility to the APS, Argonne has demonstrated its ability to bring major high profile, world leading, projects on line and operate them at the highest quality level. As an example, the rigor of design, construction and engineering operation of the APS has made it the most reliable synchrotron source in the world today. Argonne has an Office of Project Management (OPM) to stay at the forefront of project management, and to assure projects are delivered on scope, cost, and schedule. Examples of recent and ongoing leading activities include:

- **Theory and Computations Sciences building:** The OPM led the effort to define this proposed third-party financed construction project, using a "build-to-cost" model for constraining project costs.

- **Center for Nanoscale Materials:** With help from OPM, the CNM achieved notable success by receiving a report of "no findings" in the most recent Lehman review.

Figure 1 (below), illustrates the relationship of Argonne's core competencies to Argonne's business lines, while Figure 2 (below), illustrates the relationship of Argonne's core competencies to Argonne's initiatives.

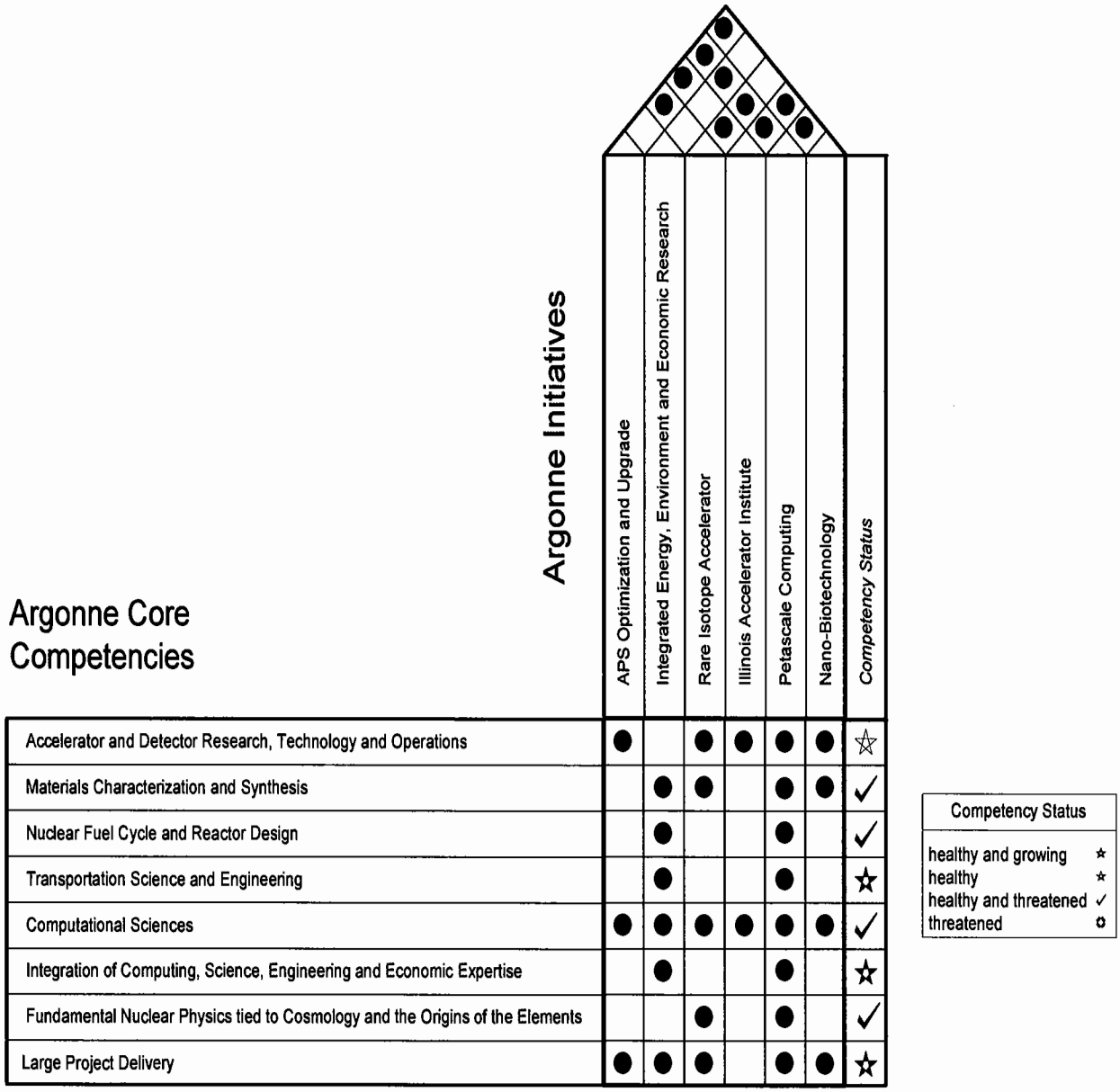

Figure 1: Relationship of Argonne Core Competencies to Argonne Business Lines

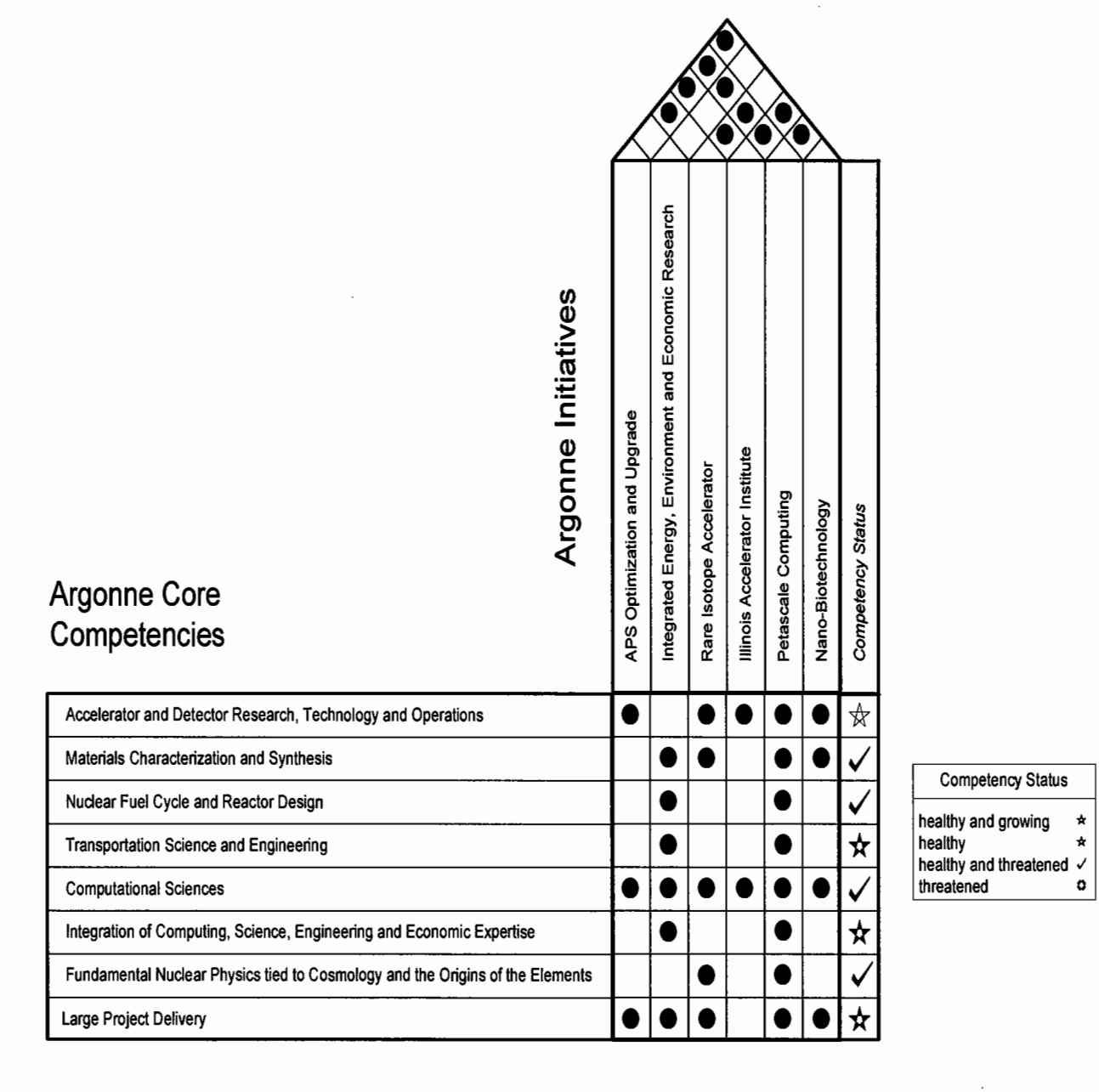

Figure 2: Relationship of Argonne Core Competencies to Argonne Initiatives

Programmatic Growth

Figures 1 and 2 show the Argonne National Laboratory's core competencies and major initiatives planned over the next 10 years. ANL is considered "best in class" nationally and internationally in materials science, mathematics and computer as well as computational science, nuclear reactor physics and engineering, nuclear fuels separations, structural biology, decision and information sciences, and environmental assessment. Major programmatic growth is envisioned over the next ten years in areas such as Petascale Computing, Nano-Biotechnology, and Integrated Energy, Environment and Economic Research. Argonne will continue its role in designing and operating major high profile, world leading, projects such as APS. APS is the most reliable synchrotron in the world today.

Argonne will also host the Howard T. Ricketts Laboratory, a nationally important new R&D scientific facility that will serve emerging needs consistent with Argonne's mission, to be operated by a consortium led by the University of Chicago and funded by the National Institutes of Health.

As noted above these major initiatives will bring infrastructure challenges however, sufficient capacity currently exists in the support infrastructure systems to accommodate the on-site population growth associated with these major initiatives.

3. CURRENT AND PLANNED BUDGET

Figure 3 (below), represents Argonne National Laboratory's FY 2005 funding scenario, while figures 4 and 5 (below) are representative of Argonne National Laboratory's projected funding based on the President's FY 2006 OMB Request, and an appropriately escalated projection of funding for FY 2007.

FY05 Funding

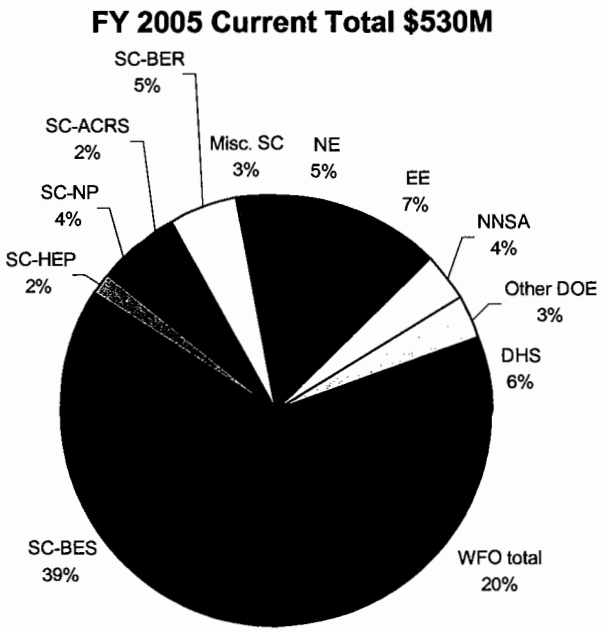

Figure 3: Argonne National Laboratory FY 2005 Funding Source Distribution

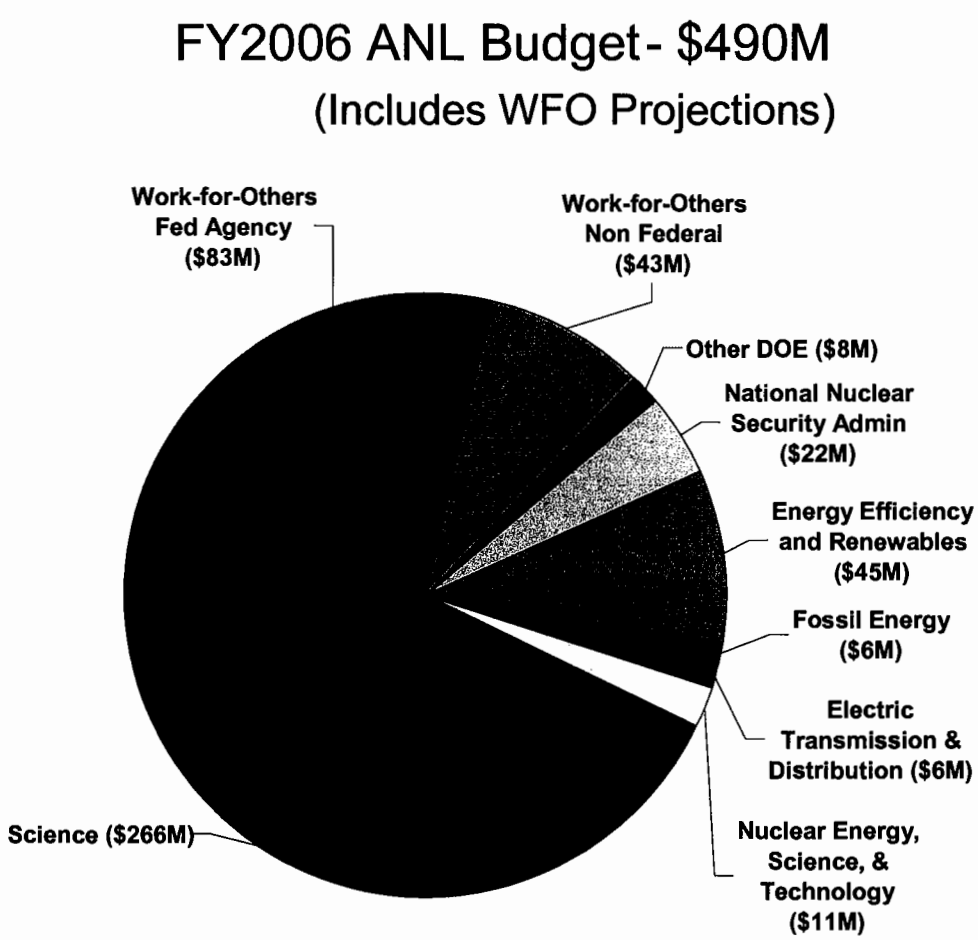

Figure 4: Argonne National Laboratory' FY 2006 President's OMB Request

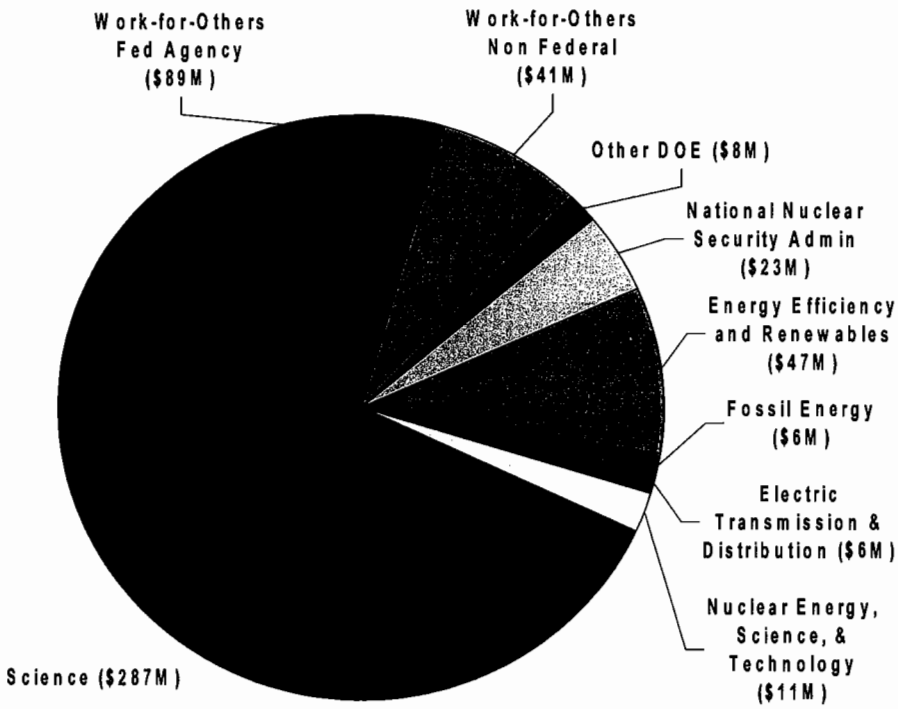

Figure 5: Argonne National Laboratory projected FY 2007 Budget. (A 3% escalation factor was applied in cases where other appropriate funding data was unavailable).

Contingency Plans
ANL can deal with the effect of reduced appropriations by:

- Pursuing efficiencies and using the existing flexibility allowed within the appropriations;
- Evaluating staffing and work scope priorities, depending on the size of the reduction.

4. MANAGEMENT APPROACH

The following is a discussion of the management approach to be employed to control changes to the work as planned and the assignment of unexpected work.

The management of work at ANL includes four fundamental activities. These are:

1) establishing a baseline for the work to be performed (planning)

2) establishing a system for modifying the baseline, if the need arises (formally changing the plan).
3) managing the project work to meet the approved baseline (implementation, monitoring, reviewing, and taking actions to achieve the baseline plan)
4) reporting (providing internal and external status information)

Establishing a baseline for the work at ANL involves planning. A baseline work plan identifies what work is to be done (scope), how much funding will be required (cost) and when will the work be done (schedule or schedule milestones). DOE, and other customers, identify the need for work as well as the requirements/expectations for the work. This is communicated to ANL through a variety of mechanisms including meetings and letters. ANL responds by developing a plan (typically a Field Work Proposal) to meet these requirements. The Field Work Proposal represents the baseline for the work and includes the work scope, cost, and schedule baseline. Authorizing ANL to proceed with this baseline work plan requires a formal contract modification to the ANL contract.

The following key activities are performed by DOE in establishing requirements/expectations for the ANL projects and programs baseline. The organization(s) that has the lead responsibility is in parentheses.

1) Perform Strategic Planning (SC HQ)
2) Identify the need for the work and requirements/expectations (SC HQ)
3) Identify ANL as the source for performing the work. This includes a review of ANL capabilities, previous year's work results, and any other reviews or advisory committee recommendations (SC HQ)
4) Prepare SC budget including ANL allocation (SC HQ)
5) Prepare Field Work proposals or Project Plans (ANL)
6) Review Field Work Proposals and Project Plans (SC HQ and ASO)
7) Issue Guidance/Funding Letters (based on Congressional appropriations) (SC HQ)
8) Establish Performance Measures (SC HQ and ASO)
9) Incorporate baseline work and performance measures into the ANL contract through a contract modification (ASO)

A contract modification is the formal baseline approval and authorization to proceed with the work. The contract modification references the SC HQ guidance letter. This guidance letter is, in turn, based on the ANL prepared Field Work Proposal. This process applies to all work. If a new activity is identified during the year and needs to be initiated right away then steps 4 through 9 will be used and the timeframes for completing those steps may be shorter.

Establishing a system for modifying the baseline allows for a change in plans. These changes can include directed changes from DOE or requests for change from ANL. The process used to modify the baseline is the same one used to approve the original baseline. In this case, it will be a contract modification based on a revised HQ guidance letter. Baseline changes can result from a number of sources such as, a change in funding, modifying the research to reflect achieved results, change in priorities, user needs, etc. In addition, some changes do not impact the work baseline. These changes can be issued as technical direction from ASO.

Managing the work to meet the approved baseline is considered the implementation or execution phase and includes a wide variety of functions. Managing the work consists of internal ANL processes and external processes conducted by DOE. The following key activities are performed during the execution by ANL.

1) Initiate work based on approved baseline for the year
2) Monitor work through periodic review of progress against expectations and identify issues and actions
3) Take/implement actions
4) Report issues and progress
5) Perform self-assessments against the work baseline and other performance expectations

The following activities are performed by DOE (SC and ASO) to measure ANL's performance in meeting the baseline:

1) Conduct various types of reviews, evaluations and assessments (SC HQ and ASO)
2) Evaluate performance periodically under the contract performance measures (mid-year, 3rd quarter, end-of-year) (ASO)
3) Identify any performance issues based on reviews and evaluations (SC HQ and ASO)
4) Assess M&O performance and pay fee (SC HQ and ASO)
5) Provide formal feedback to ANL on their performance (ASO, SC HQ)

Reporting includes collecting information, analysis, and providing reports to management. Reporting provides management with the necessary information for them to make decisions about priorities, changes, and new initiatives. ANL provides and ASO collects budget and performance information that is provided to SC HQ. This occurs through a number of mechanisms. These include:

1) development of overall priorities for DOE (annual)
2) identification of performance measures for the PART (annual)
3) submittal of the proposed DOE budget to OMB (annual)
4) defense of the DOE budget to OMB (annual)
5) defense of the DOE budget to Congress (annual)
6) submittal of data against the program measures as part of the OMB Program Assessment and Review Tool (PART) (annual)
7) report on progress submitted to the DOE Joule System (quarterly)

This information is then integrated and used in SC strategic planning and the development of baseline plans for work.

5. SITE INFRASTRUCTURE

The site currently accommodates approximately 4,800 persons (including DOE employees, contractors, and guests). Throughout the year, over 2,000 other researchers use the Laboratory's scientific facilities as visitors or collaborators. The Argonne site includes 99 buildings having 4.6 million total square feet of floor space. An additional 110,000 square feet of space is provided by various other

structures and facilities throughout the site. Building 900, with 73,229 square feet of leased space, is off-site to the southwest, approximately 3.5 miles from the center of the site. Argonne facilities are nearly 99% occupied as measured by the Argonne space management system. The replacement value of all existing facilities and other structures at Argonne is estimated to exceed $1.3 billion. Research programs supported by DOE's Office of Science (DOE-SC) account for more than half of the space usage at Argonne.

Ten Year Site Plan

The TYSP is an annual SC and DOE requirement, set forth under DOE Order 430.1B, Real Property Asset Management, of September, 2003. While the Argonne Site Office is responsible for the Argonne National Laboratory (ANL) *Ten-Year Site Plan* (TYSP), the Director of the Office of Science approves the annual TYSP.

The ANL TYSP is to document the Laboratory's vision for its 21st century scientific missions and for the supporting infrastructure. Pursuant to SC annual guidance, the plan identifies the existing condition of Argonne's infrastructure; establishes the required facilities baseline for the scientific missions of the 21st century; provides a comprehensive plan for the sustainment, recapitalization, and modernization of the existing facilities; and details the resources required to achieve the visions of Argonne and the DOE Office of Science (DOE-SC). The plan also identifies the major new programmatic facilities individually planned for integration into the existing site infrastructure.

Argonne has a rigorous process for developing and reviewing the *Ten-Year Site Plan*. The development process was built on relationships established for development of Argonne's *Institutional Plan* and the ESH&I prioritization and planning process. Mission needs identified through close programmatic collaboration with DOE Headquarters organizations and documented in the annual *Institutional Plan* form the scientific basis and core assumptions for all of these efforts.

Starting in FY 2006, the TYSP will be built upon SC's new Business Planning effort, SC's new Laboratory Appraisal Process, and the annual SC TYSP planning guidance. The guidance covers all topics related to Facilities and Infrastructure, including Land Use Planning, the Condition Assessment process, FIMS, Performance Management, Maintenance Programs, and the Integrated Facilities and Infrastructure Cross Cut Budget for the next ten years.

Projects included in the *Ten-Year Site Plan* are ranked and selected for appropriateness in several interlocking processes. Most of the needs are evaluated on the basis of established CAMP criteria and the ESH&I risk assessment. The scheduling reflects a broad consensus of operational and programmatic management and an integration of what is required to achieve the vision and initiatives identified by senior Laboratory management with regard to missions and infrastructure capabilities.

Site Planning

The comprehensive land use planning process identifies the current condition of existing land and facility assets and the scope of constraints across the site and in the surrounding region. Long-term sustainable development goals focus efforts to steward these assets and identify options for land and facilities use. The options considered take advantage of opportunities and mitigate constraints in support of the site's identified missions and research initiatives, as developed in consultation with DOE programmatic guidance and during the annual On-Site Review.

Site planning is inherently a collaborative process that facilitates open exchange of necessary technical information, and all affected parties have input into the process. For the Argonne site with its ongoing, continuing missions, DOE's Argonne Site Office has established mechanisms to engage the appropriate level of community involvement in site planning. Steps in the site planning process include:

- Identify and define current and future site missions;
- Evaluate existing site conditions and regional influences;
- Determine and quantify facility requirements to accomplish site missions;
- Formulate alternatives to satisfy facility requirements;
- Evaluate and rank the alternatives on the basis of their merits; and
- Develop a plan of action to implement the preferred solution.

The site development plan includes a parcel inventory that identifies specific management units of the site that will be opened, developed, and maintained according to the appropriate site development standards. The former ecology plots are undeveloped parcels of land that will remain undeveloped to the extent possible. Future research objectives might require rededication of an ecology plot area to development; however, this action will be considered only if no other on-site parcel can reasonably accommodate mission requirements.

The site development plan at Argonne explicitly recognizes and records key safety and environmental concepts. This plan continues to include programmatic mission areas and housing and support service areas as important ongoing functional uses. Environmentally sensitive portions of the site along existing natural areas, floodplains, streams, and steep slopes will be retained in their natural state.

Land Use Planning

Future land development at the Argonne site reflects the existing development pattern that has adequately served the Laboratory's changing needs for more than 50 years. Two key concepts underlying the site development plan are to:

1. Redevelop or expand previously developed areas of the site (for programmatic missions, housing, and support services) into dedicated expansion areas; and

2. Delineate environmentally sensitive areas and existing natural open space for ecosystem management in permanent green space or zones of transition between developed areas.

Adequate land is available to accommodate Argonne's plans for expanded programs in basic research and other areas. The site road and utilities infrastructure generally can accommodate modest growth. Facilities are now almost fully occupied, so additional construction will be required to satisfy the needs of growing programs.

Existing physical, site, and regional location factors present no constraints to planned accommodations. The planned Laboratory growth will not encroach on neighboring areas, because the site is separated from them by the greenbelt forest. The exceptional road connections to major expressways and the local arterial network can accommodate the increased traffic that will accompany such growth.

Condition Assessment Process

The CAS inspections are an integral part of the Argonne management process, providing a credible, auditable basis for determining plant and infrastructure needs and documenting these needs. This inspection process has been carried out since 1993 by trained contracted inspectors with standardized skill and experience levels and third party objectivity. The real property deficiency backlog database is the basis for evaluating individual facility conditions and for roll-up reporting via the FIMS database, the *Institutional Plan*, the *Ten-Year Site Plan*, and other management communications.

DOE Order 430.1B of September 2003 requires that Condition Assessment be performed on all real property assets at least once during any five year period.

Local Area Considerations

External Interfaces:

- Argonne National Laboratory maintains an excellent relationship with the local communities. Quarterly meetings are held with community leaders to address any issues or concerns.
- The Argonne site is ideally situated for its purpose as a 21st century multiprogram research laboratory. Its ready access to businesses, industries, and universities and its location on one of DuPage County's growth corridors ensures that the Laboratory will maintain its competitive position in attracting and retaining highly skilled and educated personnel in fostering business links to other high-technology enterprises in the area.
- Partnering Agreements with state, university, community and other business entities are critical to the success of the contract. The following is a listing, although not inclusive, of some major partnership arrangements between the contractor and outside entities:

- IAG between DOE/FBI for a Joint Operations Center housed on site.
- Midwestern Regional Center of Excellence (RCE) – Collaboration among Argonne and Region V scientists from several university and research institutions focusing on CDC category A select agents to develop therapeutics, vaccines, and diagnostic devices.
- Regional Bio Containment Laboratory (LBL) – lease to University of Chicago for land to construct RBL to serve the RCE.

Labor Unions:

ANL has maintained an excellent relationship with the labor unions conducting work at the Laboratory. To date, no strikes have occurred on site.

Facility Information Management System

FIMS is DOE's nationwide computer-based real-property tracking system. FIMS data are updated annually (as directed by DOE) by using information provided by various Laboratory organizations and personnel (e.g., Accounting, Human Resources, PFS, and building managers). At the end of each fiscal year, the FIMS facility management data and the facility accounting data reported in the Argonne Financial Information System are reconciled. This coordination ensures that all new property assets have been recorded properly within the accounting data and that all demolished assets have been removed from the data set. FIMS has been updated to include the FY 2004 data requirements; there are no outstanding issues.

For FY 2006, FIMS is being modified in order to be responsive to guidance issued from the Federal Real Property Council.

Maintenance Program for Nuclear Facilities

Each nuclear facility at Argonne has developed a Maintenance Implementation Plan (MIP) that meets the requirements of DOE O 433.1, Maintenance Management Program for DOE Nuclear Facilities, by using a "graded" approach. The MIPs have been reviewed and approved by DOE. Each MIP describes the maintenance program implemented to fit the requirements of the respective nuclear facility.

6. CONTRACTUAL CONFIGURATION

The Argonne Site Office (ASO) has direct line responsibility for the management and administration of the performance-based management and operating contract between DOE and the University of Chicago. It is the responsibility of the ASO to ensure that the Laboratory accomplishes its assigned mission(s) in a safe and environmentally-sound manner in accordance with the terms of the Prime Contract. The DOE Contracting Officer authorizes work, obligates funds, and maintains the Prime Contact terms and conditions.

The DOE Prime Contract with the University of Chicago is a cost-plus award-fee, performance-based Management and Operating (M&O) contract, subject to the appropriate provisions of the FAR and DEAR. The current contract term expires September 30, 2006. The contract annual funding is estimated at $500 million. The University of Chicago is responsible for the management of Laboratory programs/projects, maintaining and enhancing the facility, business systems, infrastructure, and assuring that Laboratory capabilities are able to meet current and future government science and technology needs.

Beginning in FY 2006, SC has undertaken a new, more consistent and corporate approach for Performance Management. SC will evaluate ANL on both Science &Technology and Operational aspects of its performance. For Operations, ANL and SC have agreed upon goals, objectives, measures and targets in the areas of ES&H, Business Systems and Resources, Facility and Infrastructure Portfolio Management, and Integrated Safeguards and Security Management. The Prime Contract includes a Performance Evaluation and Measurement Plan (PEMP), which is the primary contractual performance measurement mechanism. The PEMP is made up of performance measures encompassing the Science & Technology and Operational areas of the Laboratory. Specific performance expectations are developed by DOE and mutually agreed to with the contractor on an annual basis. The PEMP is the primary mechanism by which DOE evaluates contractor performance and subsequently determines total fee earned.

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